



13281 U.S.PTO

## **Heat sink-type cooling device for an integrated circuit**

### **Field of the invention**

The invention relates to a cooling device for an integrated circuit. More particularly, the invention relates to a heat sink-type cooling device for an integrated circuit, especially one which, by more than one heat zones that has height drop between each two zones, is able to match up the inner space allocation of the computer mainframe and be assembled more easily into the computer mainframe so that heat is dispersed efficiently.

## Description of the related art

Accordingly, a heat sink of the prior art (as FIG. 8) comprises a base 3 and plurality of fin 31 extended upward. Said plurality of fin 31 is framed by solid mental plate and is set on said base 3 having the same height. Its usage is to stick said base 3 on the heat source in the computer mainframe (such as CPU) to make said base 3 absorb the heat of the heat source and conduct it to plurality of fin to disperse heat. Besides, a fan (as alternative) can be set upon said plurality of fin of the same height to inhale the air and direct it to said plurality of fin to disperse heat.

The above heat sink has the ability to disperse the heat of the heat source in the computer mainframe. But, because said plurality of fin of the same height 31 is set upon said base 3, when the equipment in the computer mainframe is expanded, the height of said plurality of fin 31 affect the inner

space allocation of the mainframe and the inner space allocation of the mainframe is limited by the heat sink. Therefore, usual heat sink of the prior art does not meet the need of the user.

Brief summary of the invention

Therefore, the purpose of the present invention is to make a heat sink having more than one heat zone with height drop between each two zones. The purpose is to make said heat sink be able to match up the inner space allocation of the computer mainframe and be installed into the computer mainframe more easily so as to efficiently disperse heat.

To achieve the above goals, present invention is a heat sink-type cooling device for an integrated circuit comprising a base and plurality of fin extended upward from one end surface of said base. Said plurality of fin is divided into more than one heat zones and said plurality of heat zone has height drop between each two zones. By these heat zones with height drop between each two zones, said heat sink-

type cooling device for an integrated circuit is able to match up the inner space allocation of the computer mainframe. Rectangular hole can also be punched on the plate of said plurality of fin which is not connected with said base so as to improve the efficiency of heat dispersing of said heat sink-type cooling device for an integrated circuit.

#### Brief description of the drawings

The present invention will be better understood from the following detailed description of preferred embodiments of the invention, taken in conjunction with the accompanying drawings, in which

FIG.1 is a perspective view of the first preferred embodiment according to the present invention;

FIG.2 is an exploded view of the structure of the first preferred embodiment according to the present invention;

FIG.3 is a perspective view of the second preferred

embodiment according to the present invention;

FIG.4 is a perspective view of the third preferred embodiment according to the present invention;

FIG.5 is a perspective view of the fourth preferred embodiment according to the present invention;

FIG.6 is a perspective view of the fifth preferred embodiment according to the present invention;

FIG.7 is a perspective view of the sixth preferred embodiment according to the present invention; and

FIG.8 is a perspective view of the prior art.

#### Description of the preferred embodiments

The following descriptions of the preferred embodiments are provided to understand the features and the structures of the present invention.

Please refer to FIG.1 till FIG.5, which are a perspective view of the first preferred embodiment, an exploded view of the structure of the first preferred embodiment, a perspective view of the

second preferred embodiment, a perspective view of the third preferred embodiment, and a perspective view of the fourth preferred embodiment, according to the present invention. As shown in the above figures, present invention is a heat sink-type cooling device for an integrated circuit 1 comprising a base 11 and plurality of fin 12. An end of said plurality of fin 12 is connected with an end surface of said base and is extended upward. Said plurality of fin 12 is framed by bending a mental plate into more than one vertical plate 121 and plurality of horizontal plate 122 which is connected to the said vertical plate by turns. And said plurality of horizontal plate 122 is divided into more than one heat zone 13,14 wherein there is drop height between each two zones. Different type of said heat sink-type cooling device for an integrated circuit 1a,1b and 1c (as FIG.3, FIG.4 and FIG.5) can be made according to actual requirements which has different height drop of said heat zones 13 14. When assembling, said heat sink-type cooling device for an integrated circuit 1 with

said heat zones having drop height between each two zones 13 and 14 is to fit in the space allocation of the computer mainframe in effect, which is to keep away from and be harmony with the electronic components and connectors on the main board, and is not limited by the original space allocation of the computer mainframe so that said heat sink-type cooling device is assembled more easily into the computer mainframe to efficiently disperse heat. Thereby, a brand new heat sink-type cooling device for an integrated circuit is constructed according to the structure mentioned above.

Please refer to FIG.6, which is the perspective view of the fifth embodiment according to present invention. As shown in the above figure, said heat sink-type cooling device for an integrated circuit 2 comprises a base 21 and plurality of fin 22 wherein an end of said plurality of fin 22 is connected with an end surface of said base 21 and is extended upward. Said plurality of fin is divided into more than one heat zone 23,24 and said heat zones 23,24

have height drop between each two zones. Said plurality of fin 22 is framed by bending a mental plate into more than one vertical plate 221 and plurality of horizontal plate 222 which is connected with said vertical plates 221 by turns. Each of those horizontal plates 222 which is not connected with said base is punched with a rectangular hole 223 and on punching said rectangular holes 223 on the fins 22, required rectangular holes 223 on the horizontal plates 222 can be punched first, and then bend said mental plate to form heat zones 23,24 with height drop between each two zones; or, on punching rectangular holes 223 on the horizontal plates 222, required rectangle holes 223 on the horizontal plates 222 can be punched, and simultaneously bend said mental plate to form heat zones 23,24 with drop height between each two zones. Said heat zones 23,24 which have drop height between each two zones are to keep away from and be harmony with the electronic components and connectors on the main board. As a result, said heat sink-type cooling device for an

integrated circuit 2 is to fit in the space allocation of the computer mainframe in effect and is not limited by the original space allocation of the computer mainframe and said heat sink-type cooling device 2 can be assembled even more easily into the computer mainframe. And by the help of the rectangular holes 223 on the horizontal plates for better ventilation, the efficiency of the heat dispersing of said heat sink-type cooling device for an integrated circuit 2 is improved and heat is dispersed efficiently.

Please refer to FIG.7, which is the perspective view of the sixth embodiment according to present invention. As shown in the above figure, said heat sink-type cooling device for an integrated circuit 3 comprises a base 41 and plurality of fin 42 extended from an end surface of said base 41. Said plurality of fin 42 is divided into more than one heat zone 43,44 and said heat zones 43,44 have height drop between each two zones. Each of said plurality of heat zone 43,44 is framed by bending a mental plate.

After said plurality of heat zone 43,44 is framed by bending said mental plate, a heat sink-type cooling device for an integrated circuit is made by putting it on said base 41.

The preferred embodiments herein disclosed are not intended to unnecessarily limit the scope of the invention. Therefore, simple modifications or variations belonging to the equivalent of the scope of the claims and the instructions disclosed herein for a patent are all within the scope of the present invention.